BK

ND Dept. of Health Emission Inventory Summary Year: **2014**

Company:	**Montana-Dakota Utilities Co.**	AIRS/AFS Source Code:	38-059-00001
PTO Number:	T5-F76001	Annual Permit Fee Billing:	**YES**
Unit or Station	RM Hesket Station Mandan	Reviewed By:	KDH

Individual Emission Sources

EU	Source Unit	SCC	PM10	$PM_{2.5}$	CPM	SO2	NOX	CO	VOC
1	Unit 1 boiler - coal	10100306	3.0	2.4	8.4	1030.0	350.8	302.5	1.8
2	Unit 2 boiler - coal	10100317	9.9	8.1	229.4	2338.5	984.2	992.0	5.9
5	Unit 2 sand dryer	10200603					0.3	0.1	
6	Unit 3 turbine	20100201				0.1	0.5	1.3	0.1
M1-M7	Coal & ash handling units	39000399	4.6						
Total Facility Emissions (Tons/yr) - Less HAPs			17.5	10.5	237.8	3368.6	1335.8	1295.9	7.8

Hazardous Air Pollutants (Tons)				
Pollutant/Chemical Name	Unit 1	Unit 2		Total
Hydrogen Chloride	0.5	1.1		
Hydrogen Floride	0.6	0.2		
Plant Totals	1.1	1.3	0.0	2.2

Special Pollutants/Parameters	Gross	NH3	Hg
Emission Process	MW	(lbs)	(lbs)
Unit 1	121,107	5.6	7.0
Unit 2	492,389	15.5	10.9
Unit 3	1,823		

Fuel Combusted& Process/Production Qty	
Coal Lignite (Tons)	517,703
Coal Subbituminous (Tons)	90
Natural Gas (MMScf)	27.3
LPG/Propane (Gal)	
Low Sulfur Diesel (Gal)	
Distillate Oil (Gal)	
Residual Oil (Gal)	
Tire Derived Fuel-TDF (Tons)	
Sand (Tons)	20,295
Turbine hrs	30

Action	Date	Initial
Scanned		
Checked		
Data Base		

FUEL BURNING EQUIPMENT USED FOR INDIRECT HEATING
ANNUAL EMISSION INVENTORY REPORT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8536 (11-10)

BIC

GENERAL

Name of Firm or Organization Montana Dakota Utilities Co.	Permit to Operate Number T5-F76001	Year of Emissions 2014	
Mailing Address 400 North 4th Street	City Bismarck	State ND	Zip Code 58501
Facility Name RM Heskett Station	Facility Location Mandan, ND	Emission Unit Number EU1	

EQUIPMENT INFORMATION

Manufacturer of Unit Riley Stoker Corporation (Spreader Stoker)	Model Number	Maximum Heat Input (Btu/hr) 387.63 MMBtu/Hr
Boiler Type: ☐Pulverized Tangential ☐Cyclone X Spreader Stoker ☐Pulverized Wall Fired ☐Fluidized Bed ☐Other	Electricity Generated (MWe)* 121,107 (Gross)	Actual Hours of Operation 7471.2

*Electric utility only.

FUELS USED		Primary Fuel	Standby Fuel	Other Fuel
Type (ex. lignite, natural gas, LPG No. 2 fuel oil, No. 6 fuel oil. etc.)		Lignite		
Quantity of Fuel per Year (Specify Units: ex. ton, gal, cu.ft., etc.)		120,991 Tons		
Percent Ash (Coal Only)	Maximum Minimum Average	13.04 5.46 7.53		
Percent Sulfur	Maximum Minimum Average	3.94 % 0.33 % 0.72 %		
Btu per Unit (Specify lb, ton, gal, etc.)	Maximum Minimum Average	7281.0 Btu/lb 6404.0 Btu/lb 6942.0 Btu/lb		
Percent Sodium in Coal Ash Average		Not Applicable		

TOTAL STACK EMISSIONS (USE THE TABLE ABOVE FOR SINGLE FUEL USAGE; USE OTHER SIDE IF MULTIPLE FUELS ARE USED AND THEN SUMMARIZE THE TOTAL EMISSIONS PER YEAR ON THE FOLLOWING TABLE.)

Air Contaminant **	Emission Factor (Include Units)	Emission Factor Source (Include Test Date if Applicable)	Tons
Particulate – Total	0.004 lb/MMBtu	GE, Inc. Report 8/25/2011	3.36
PM_{10} (Particulate < 10 microns)	90% of Total Particulate	NDDH Recommendation	3.02
$PM_{2.5}$ (Particulate < 2.5 microns)	78% of PM 10	EPA PM Calculator 2.0.2	2.36
Sulfur Dioxide		CEMS Mass Emissions	1030
Nitrogen Oxides	5.8 lb/ton	AP-42 Table 1.7-1	350.8
Carbon Monoxide	5.0 lb/ton	AP-42 Table 1.1-3	302.5
Total Organic Compounds: Nonmethane	0.03 lb/ton	AP-42 Table 1.7-1	1.81
Mercury***	4.17E-06 lb/MMBtu	GE, Inc. Report 8/25/2011	0.00 (7.00 lb/yr)
Ammonia***	1.5591 x 10-10 lb/scfh	Coal Creek Study	0.00 (5.79 lb/yr)

**Submit SFN 19839 for Hazardous Air Pollutants if applicable.
***Title V units only.

I declare under the penalties of perjury that this report has been examined by me and to the best of my knowledge is a true, correct and complete report.

Print Name of Person Submitting Report	Title	Email
Todd Peterson	Environmental Scientist	Todd.Peterson@mdu.com
Signature Todd Peterson	Telephone Number 701-222-7835	Date 03/10/2015

Return completed form to:
North Dakota Department of Health
Division of Air Quality
918 E Divide, 2nd Floor
Bismarck, ND 58501-1947
Telephone: (701)328-5188

HAZARDOUS AIR POLLUTANT ANNUAL EMISSIONS INVENTORY REPORT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 19839 (11-11)

Name of Firm or Organization	Permit to Operate Number	Year of Emissions	
Montana Dakota Utilities Co.	T5-F76001	2014	
Mailing Address	City	State	Zip Code
400 North 4th Street	Bismarck	ND	58501
Facility Name	Facility Location	Emission Unit Number	
RM Heskett Station	Mandan, ND	EU1	
Amount of Material Processed (material used, etc.) 120,991 Tons of Lignite Coal			
Hours of Operation: 7471.2	Air Pollution Control Equipment: Electrostatic Precipitator (ESP)		

HAZARDOUS AIR POLLUTANT EMISSIONS:

CHEMICAL EMITTED TO AIR	CAS NUMBER	EMISSIONS QUANTITY	
		Emission Factor (include units)	TONS
Hydrogen Chloride		6.47E-04 lb/MMBtu	0.54
Hydrogen Fluoride		6.99E-04 lb/MMBtu	0.59
		Emission rates determined based on emissions testing performed by TRC (formerly GE Energy) on August 25-31, 2011. Test Report# ZTNO0389	

I declare under the penalties of perjury that this report has been examined by me and to the best of my knowledge is a true, correct and complete report.

Print Name of Person Submitting Report	Title	Email
Todd Peterson	Environmental Scientist	Todd.Peterson@mdu.com
Signature Todd Peterson	Telephone Number 701-222-7835	Date 03/10/2015

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2014
HESKETT STATION UNIT #1 ANNUAL EMISSION INVENTORY WORK SHEET

Hours of Operation		7,471	Hours
Average Stack Flow Rate (ACFH)		4,968,853	SCFH
Gross MW		121,107	MWhrs
Quantity of Fuel	Lignite	120,991	Tons
	Subbituminous	0	Tons
	Tire Derived Fuel (TDF)	0	Tons
		Total Fuel	
		120,991	Tons/yr.
Average Heating Value	Lignite	6,942	BTU\lb
	Subbituminous	0	BTU\lb
	Tire Derived Fuel (TDF)	0	BTU\lb
Particulate Emission Rate		0.004	lbs/MMBTU
Particulate Emission Rate (Aqueous and Organic Condensables)		0.01	lbs/MMBTU
Particulate Emission Rate (NDDH emission factor)		0.04	lbs/MMBTU
Sulfur Dioxide Emissions (CEMS)		1029.7	Tons/yr.
Used Oil Burned		0	Gallons
Waste Solvent Burned		0	Gallons

		Lignite	Sub-Bit.	TDF	Total	
Particulate ***						
((Tons Coalx2000xBTU)x(Emission Rate/MBTU))/2000 lb/ton	=	3.36	0.00	0.00	3.36	Tons/yr.
PM 10 ******						
Tons per Year x 90.0%	=	3.02	0.00	0.00	3.02	Tons/yr.
PM 2.5 ******						
Tons per Year x % of PM10 (78.0 Lignite; 90.9% Sub-Bit.; 95% TDF)	=	2.36	0.00	0.00	2.36	Tons/yr.
PM Condensable*** (GE Performance Test 7/2011 (0.001 lb/MMBtu))						
((Tons Coalx2000xBTU)x(Emission Rate/MBTU))/2000 lb/ton	=	8.40			8.40	Tons/yr.
SO2 *			0.00			
Total tons emitted as determined by CEMS ****	=	---		---	1,030	Tons/yr.
NOx *			0.00			
(Tons Coal x 5.8 lbs/Ton)/2000 lb/ton	=	350.87		0.00	350.87	Tons/yr.
CO *						
(Tons of Coal x 5.0 lbs/T)/2000 lb/ton	=	302.48	0.00	0.00	302.48	Tons/yr.
HC(nm) *						
Tons of Coal x Emission Rate (0.03 lbs/T lignite or 0.05lbs/T SubBit) / 2000 lb/ton	=	1.81	0.00	0.00	1.81	Tons/yr.
HCL*** Emission Rate (2011)	=	6.47E-04	0.00		6.47E-04	lb/MMBtu
((Tons Coalx2000xBTU)x(Emission Rate/MBTU))/2000 lb/ton	=	0.54			0.54	Tons/yr.
HF*** Emission Rate (2011)	=	6.99E-04	0.00		6.99E-04	lb/MMBtu
((Tons Coalx2000xBTU)x(Emission Rate/MBTU))/2000 lb/ton	=	0.59			0.59	Tons/yr.
Ammonia*****						
(1.5591X 10-10 lb/scfh) X (Flow SCFH) X (Operating Hours)	=	5.79			5.79	lbs/Year
	=				0.00	Tons/yr.
Mercury***			0.00		0.00	Tons/Yr.
((Tons Coalx2000xBTU)x(Emission Rate/MBTU))/2000 lb/ton	=	4.17E-06	lb/MMbtu		0.00350	Tons/yr.
	=	4.17	lb/Tbtu		7.00	lb/year

* Per AP-42 Method (9/98) Tables 1.7-1&1.1-3

** Per Gary Helbling - NDSDH & CL - 2/28/90

*** Per 2011 Emissions Test-**GE Energy ZTNO0389**, AP-42 Method(9/98) Table 1.1-9**(PM)**, AP-42 Method(9/98) Table 1.1-15**(HCl/HF)**, AP-42 Method(9/98) Table 1.1-18**(trace metals)**

**** Per CEMS Annual Emissions

***** Emmission Factor Data obtained from testing conducted at Coal Creek

****** Estimated using EPA PM Calculator 2.0.2 and Engineering Judgement

******* Subbit. emission factors used where none availble for TDF

******** Hg Rates Based on 1999 Mostardi Platt Mercury ICR Test on Unit 2.
Estimate based on fuel average of 3.126 grams/hr during ICR test scaled down for difference in heat input between units and assumes 25% removal efficiency and 60% unit capacity factor.

FUEL BURNING EQUIPMENT USED FOR INDIRECT HEATING
ANNUAL EMISSION INVENTORY REPORT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8536 (11-10)

BF

GENERAL

Name of Firm or Organization Montana Dakota Utilities Co.	Permit to Operate Number T5-F76001	Year of Emissions 2014	
Mailing Address 400 North 4th Street	City Bismarck	State ND	Zip Code 58501
Facility Name RM Heskett Station	Facility Location Mandan, ND	Emission Unit Number EU2	

EQUIPMENT INFORMATION

Manufacturer of Unit Riley Stoker Corporation (Atmospheric Bubbling Fluidized Combustor)	Model Number	Maximum Heat Input (Btu/hr) 916.5 MMBtu/Hr
Boiler Type: ☐Pulverized Tangential ☐Cyclone ☐Spreader Stoker ☐ Pulverized Wall Fired X Fluidized Bed ☐ Other	Electricity Generated (MWe)* 492,389 (Gross)	Actual Hours of Operation 7,809.5

*Electric utility only.

FUELS USED

		Primary Fuel	Standby Fuel	Other Fuel
Type (ex. lignite, natural gas, LPG No. 2 fuel oil, No. 6 fuel oil. etc.)		Lignite	Subbituminous	
Quantity of Fuel per Year (Specify Units: ex. ton, gal, cu.ft., etc.)		396,712 Tons	90 Tons	
Percent Ash (Coal Only)	Maximum	17.94 %		
	Minimum	4.54 %		
	Average	7.55 %		
Percent Sulfur	Maximum	3.38 %		
	Minimum	0.31 %		
	Average	0.71 %		
Btu per Unit (Specify lb, ton, gal, etc.)	Maximum	7315 Btu/lb		
	Minimum	6523 Btu/lb		
	Average	6968 Btu/lb	8735 Btu/lb	
Percent Sodium in Coal Ash Average		Not Applicable		

TOTAL STACK EMISSIONS

(USE THE TABLE ABOVE FOR SINGLE FUEL USAGE; USE OTHER SIDE IF MULTIPLE FUELS ARE USED AND THEN SUMMARIZE THE TOTAL EMISSIONS PER YEAR ON THE FOLLOWING TABLE.)

Air Contaminant **	Emission Factor (Include Units)	Emission Factor Source (Include Test Date if Applicable)	Tons
Particulate – Total	0.004 lb/MMBtu	GE, Inc. Report 8/25/2011	11.08
PM_{10} (Particulate < 10 microns)	90% of Total Particulate	NDDH Recommendation	9.97
$PM_{2.5}$ (Particulate < 2.5 microns)	78% of PM 10	EPA PM Calculator 2.0.2	8.07
Sulfur Dioxide		CEMS Mass Emissions	2338.5
Nitrogen Oxides		CEMS Mass Emissions	984.2
Carbon Monoxide	5.0 lb/ton	AP-42 Table 1.1-3	992.01
Total Organic Compounds: Nonmethane	0.03 lb/ton	AP-42 Table 1.7-1	5.95
Mercury***	1.97E-06 lb/MMBtu	GE, Inc. Report 8/25/2011	0.00 (10.89 lb/yr)
Ammonia***	1.5591 x 10-10 lb/scfh	Coal Creek Study	0.01 (15.50 lb/yr)

**Submit SFN 19839 for Hazardous Air Pollutants if applicable.
***Title V units only.

I declare under the penalties of perjury that this report has been examined by me and to the best of my knowledge is a true, correct and complete report.

Print Name of Person Submitting Report	Title	Email
Todd Peterson	Environmental Scientist	Todd.Peterson@mdu.com
Signature: Todd Peterson	Telephone Number 701-222-7835	Date 03/10/2015

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HAZARDOUS AIR POLLUTANT ANNUAL EMISSIONS INVENTORY REPORT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 19839 (11-11)

Name of Firm or Organization	Permit to Operate Number	Year of Emissions	
Montana Dakota Utilities Co.	T5-F76001	2014	
Mailing Address	City	State	Zip Code
400 North 4th Street	Bismarck	ND	58501
Facility Name	Facility Location	Emission Unit Number	
RM Heskett Station	Mandan, ND	EU2	
Amount of Material Processed (material used, etc.) 396,712 Tons of Lignite Coal & 90 Tons of Subbituminous			
Hours of Operation: 7809.5	Air Pollution Control Equipment: Multi Cyclone and Electrostatic Precipitator (ESP) – Particulate Control		

HAZARDOUS AIR POLLUTANT EMISSIONS:

CHEMICAL EMITTED TO AIR	CAS NUMBER	EMISSIONS QUANTITY	
		Emission Factor (include units)	TONS
Hydrogen Chloride		4.06E-04 lb/MMBtu	1.12
Hydrogen Fluoride		7.95E-05 lb/MMBtu	0.22
		Emission rates determined based on emissions testing performed by TRC (formerly GE Energy) on August 25-31, 2011. Test Report# ZTNO0389	

I declare under the penalties of perjury that this report has been examined by me and to the best of my knowledge is a true, correct and complete report.

Print Name of Person Submitting Report	Title	Email
Todd Peterson	Environmental Scientist	Todd.Peterson@mdu.com
Signature Todd Peterson	Telephone Number 701-222-7835	Date 03/10/2015

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2014

HESKETT STATION UNIT #2 ANNUAL EMISSION INVENTORY WORK SHEET

				Total Fuel
Hours of Operation		7,810	Hours	
Average Stack Flow Rate (ACFH)		12,727,639	SCHF	
Gross MW		492,389	MWhrs	
Quantity of Fuel	Lignite	396,712	Tons	
	Subbituminous	90	Tons	
	Tire Derived Fuel (TDF)	0	Tons	396,802 Tons/yr.
Average Heating Value	Lignite	6,968	BTU\lb	6,968 BTU/lb
	Subbituminous	8,735	BTU\lb	
	Tire Derived Fuel (TDF)	0	BTU\lb	
Particulate Emission Rate		0.004	lbs/MBTU	
Particulate Emission Rate (Aqueous and Organic Condensables)		0.083	lbs/MBTU	
Sulfur Dioxide Emissions (CEMS)		2,339	Tons/yr.	
Nitrogen Oxide Emissions (CEMS)		984.2	Tons/yr.	
Used Oil Burned		1375	Gallons	
Waste Solvent Burned		100	Gallons	

		Lignite	Sub-Bit.	TDF	Total	
Particulate ***						
((Tons Coalx2000xBTU)x(Emission Rate/MBTU))/2000 lb/ton	=	11.06	0.02	0.00	11.08	Tons/yr.
PM10 **						
Tons per Year x 90.0%	=	9.95	0.02	0.00	9.97	Tons/yr.
PM 2.5 ******						
Tons per Year x % of PM10 (81.0% Lignite; 94.4% Sub-Bit.; 95% TDF)	=	8.06	0.01	0.00	8.07	Tons/yr.
PM Condensable*** (GE Performance Test 7/2011 (0.083 lb/MMBtu))						
((Tons Coalx2000xBTU)x(Emission Rate/MBTU))/2000 lb/ton	=	229.44			229.44	Tons/yr.
SO2 *						
Total tons emitted as determined by CEMS ****	=	2,338.50	1.58	---------	2,338.50	Tons/yr.
NOx *						
Total tons emitted as determined by CEMS ****	=	984.20	0.40	---------	984.20	Tons/yr.
CO *						
(Tons of Coal x 5.0 lbs/T)/2000 lb/ton	=	991.78	0.23	0.00	992.01	Tons/yr.
HC(nm) *						
Tons of Coal x Emission Rate (0.03 lbs/T lignite or 0.05lbs/T SubBit) / 2000 lb/ton	=	5.95	0.00	0.00	5.95	Tons/yr.
HCL*** Emission Rate (2011)	=	4.06E-04			4.06E-04	lb/MMBtu
((Tons Coalx2000xBTU)x(Emission Rate/MBTU))/2000 lb/ton	=	1.12	0.00		1.12	Tons/yr.
HF*** Emission Rate (2011)	=	7.95E-05			7.95E-05	lb/MMBtu
((Tons Coalx2000xBTU)x(Emission Rate/MBTU))/2000 lb/ton	=	0.22	0.00		0.22	Tons/yr.
Ammonia*****						
(1.5591X 10-10 lb/scfh) X (Flow SCFH) X (Operating Hours)	=	15.50			15.50	lbs/Year
	=	0.01			0.01	Tons/yr.
Mercury***						
((Tons Coalx2000xBTU)x(Emission Rate/MBTU))/2000 lb/ton	=	1.97E-06	lb/MMbtu		0.00545	Tons/yr.
	=	1.97	lb/Tbtu		10.89	lbs/yr.

* Per AP-42 Method (9/98) Tables 1.7-1-1 , 1.1-3 , 1.1-19

** Per Gary Helbling - NDSDH & CL - 2/28/90

*** Per 2011 Emissions Test-**GE Energy ZTNO0389**,AP-42 Method(9/98) Table 1.1-9**(PM)**,AP-42 Method(9/98) Table 1.1-15**(HCl/HF)**,AP-42 Method(9/98) Table 1.1-18**(trace metals)**

**** Per CEMS Annual Emissions

***** Emmission Factor Data obtained from testing conducted at Coal Creek

****** Estimated using EPA PM Calculator 2.0.2 and Engineering Judgement

MANUFACTURING OR PROCESSING EQUIPMENT
ANNUAL EMISSION INVENTORY REPORT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8537 (11-10)

GENERAL

Name of Firm or Organization	Permit to Operate Number	Year of Emissions	
Montana Dakota Utilities Co.	T5-F76001	2014	
Mailing Address	City	State	Zip Code
400 North 4th Street	Bismarck	ND	58501
Facility Name	Facility Location	Actual Hours of Operation	
RM Heskett Station	Mandan, ND	3,254	
Source Unit Description		Emission Unit Number	
RM Heskett Station – Sand Dryer		EU5	

RAW MATERIAL INFORMATION

Raw Materials Introduced into Process	Quantity (Specify Units)
Sand	20,295 Tons

FUELS USED

		Primary Fuel	Auxiliary Fuel
Type (ex. lignite, natural gas, LPG No. 2 fuel oil, No. 6 fuel oil. etc.)		Natural Gas	
Quantity of Fuel per Year (Specify Units: ex. ton, gal, cu.ft., etc.)		6,640 MCF	
Percent Sulfur	Maximum Minimum Average	2.0 gr./100 scf	
Btu per Unit (Specify lb, ton, gal, etc.)	Maximum Minimum Average	1118 Btu/CF	

STACK EMISSIONS

Air Contaminant *	Emission Factor (Include Units)	Emission Factor Source (Include Test Date if Applicable)	Tons
Particulate - Total	0.0066 lb/MMBtu	Engineering Estimates	0.024
PM_{10} (Particulate < 10 microns)	100% of Total Particulate	Engineering Estimates	0.024
$PM_{2.5}$ (Particulate < 2.5 microns)	100% of Total Particulate	Engineering Estimates	0.024
Sulfur Dioxide	0.0034 lb/MMBtu	AP 42 Table 3.1-2a(h)	0.013
Nitrogen Oxides	100 lbs/MMCF	PTE emission factors listed in T5 permit application (7/96)	0.33
Carbon Monoxide	20.0 lbs/MMCF	PTE emission factors listed in T5 permit application (7/96)	0.07
Total Organic Compounds: Nonmethane	5.3 lb/MMCF	PTE emission factors listed in T5 permit application (7/96)	0.02

* Submit SFN 19839 for Hazardous Air Pollutants if applicable.

I declare under the penalties of perjury that this report has been examined by me and to the best of my knowledge is a true, correct and complete report.

Print Name of Person Submitting Report	Title	Email
Todd Peterson	Environmental Scientist	Todd.Peterson@mdu.com
Signature: Todd Peterson	Telephone Number: 701-222-7835	Date: 03/10/2015

Return completed form to:
North Dakota Department of Health
Division of Air Quality
918 E Divide, 2nd Floor
Bismarck, ND 58501-1947
Telephone: (701)328-5188

2014

HESKETT STATION SMALL EMISSION UNITS ANNUAL EMISSION INVENTORY WORK SHEET

Unit 1 Hours of Operation	7,471	Hours
Coal Total Tons Both Units	517,793	Tons
Unit 2 Hours of Operation	7,810	Hours
Unit 2 Particulate Emission Rate	0.004	lbs/MBTU
Unit 2 Fluid Bed Material (Sand)	20,295	Tons
Total Quantity of Ash Handled	55,000	Tons
EUI	0.0	Hours

Sand Dryer*

Raw Material introduced into process (sand)	20,295	Tons
Quantity of Natural Gas Burned	6,640.0	MCF
Quantity of Fuel (Decatherms (DKT) Natural Gas)	7,424	MMBtu
Average Heating Value (Natural Gas)	1118	Btu/CF
Hours of Operation (runtime estimated 10 hrs per day when Unit 2 is running)	3,254	Hours

Particulate** ((0.0066 lbs / MMBtu) X (Quantity of Fuel MMBtu))/2000	=	0.024	Tons/yr.
SO2 (Total tons included in Unit 2 totals as determined by CEMS)***** ((0.0034 lbs / MMBtu *) X (Quantity of Fuel MMBtu))/2000	=	0.013	Tons/yr.
NOx*** ((100 lbs / MCF) X Quantity of Fuel)/2000	=	0.33	Tons/yr.
CO (Total tons included in Unit 2 totals as determined by CEMS)*** ((20 lbs / MCF) X Quantity of Fuel)/2000	=	0.07	Tons/yr.
VOC*** ((5.3 lbs / MCF) X Quantity of Fuel)/2000	=	0.02	Tons/yr.
Ammonia******** (Quantity of Fuel MCF x 3.20 lbs/MCF)/2000	=	0.01	Tons/yr.

Per 8.B.E (EU3) & (M8) Emergency Generator and Gasoline Storage Tank are permitted as insignificant units, therfore do not need to be included in the Annual Emission Inventory Report

COMPRESSOR/INDUSTRIAL ENGINES
ANNUAL EMISSIONS INVENTORY REPORT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 11829 (06-14)

GENERAL

Name of Film or Organization	Permit to Operate Number	Year of Emissions	
Montana Dakota Utilities Co.	T5-F76001 (PTC13016)	2014	
Mailing Address	City	State	ZIP Code
400 North 4th Street	Bismarck	ND	58501
Facility Name	Facility Location	Emission Unit Number	
RM Heskett Station	Mandan, ND	EU6	

EQUIPMENT INFORMATION

☒ Stationary Gas Turbine	☐ Reciprocating Engine ☐ 2-Stroke Lean Burn	☐ Dual Fuel Engine	☒ Spark Ignition
☐ Stationary Large Bore Diesel	☐ 4-Stroke Lean Burn ☐ 4-Stroke Rich Burn	☐ Other, Specify_____	☐ Compression Ignition

Manufacturer of Unit	Model Number	Actual Hours of Operation
General Electric	PG7121(EA)	30
Maximum Rating	Design Capacity	
	88 MW	

FUELS USED

Natural Gas		Thousand Cu. Ft. 19,690	Btu/Cu. Ft. 1,054	Percent H_2S 2.0 gr./scf
Diesel	(if applicable)	Gallons	Btu/Gal	
LP Gas	(if applicable)	Gallons	Btu/Gal	
Other (Specify)		Specify	Btu/Unit	

COMPRESSOR STATION FLARE STACK EMISSIONS

Quantity Flared Thousand Cu. Ft./Yr	Average H_2S Content	SO_2 Emissions Tons/Yr

TOTAL STACK EMISSIONS

(The table below is used for single fuel combustion. Use the tables on the other side if multiple fuels are combusted and then summarize the total emissions per year in the "Tons" column below)

Air Contaminant*	Emission Factor (Include Units)	Emission Factor Source (Include Test Date if Applicable)	Tons
Particulate – Total PM Filterable)	0.0020 lb/MMBtu	TRC Test Report #221170B (10/02/2014)	0.021
Particulate - PM_{10} (Filterable)	100% of Total Particulate		0.021
Particulate - $PM_{2.5}$ (Filterable)	100% of Total Particulate		0.021
Particulate – CPM (Condensable)	0.0012 lb/MMBtu	TRC Report #221170B (10/02/2014)	0.012
Sulfur Dioxide	5.5 lb/hr	AP-42 Table 3.1-2a (from permit application)	0.08
Nitrogen Oxides	0.50 tons/yr	CEMS Mass Emissions	0.50
Carbon Monoxide	1.3 tons/yr	CEMS Mass Emissions	1.3
Total Organic Compounds: Nonmethane	3.1 lb/hr	Manufacture data (from permit application)	0.05
Greenhouse Gases (CO2e)	1,290 tons/yr	CEMS Mass Emissions	1,290

*Submit SFN 19839 for Hazardous Air Pollutants; include formaldehyde and total hazardous air pollutant emissions.

I declare under the penalties of perjury that this report has been examined by me and to the best of my knowledge is a true, correct and complete report.

Print Name of Person Submitting Report	Title	Telephone Number
Todd Peterson	Environmental Scientist	701-222-7835
Signature Todd Peterson	Email Address Todd.Peterson@mdu.com	Date 03/10/2015

HAZARDOUS AIR POLLUTANT ANNUAL EMISSIONS INVENTORY REPORT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 19839 (11-11)

Name of Firm or Organization	Permit to Operate Number	Year of Emissions	
Montana Dakota Utilities Co.	T5-F76001 (PTC13016)	2014	
Mailing Address	City	State	Zip Code
400 North 4th Street	Bismarck	ND	58501
Facility Name	Facility Location	Emission Unit Number	
RM Heskett Station	Mandan, ND	EU6	
Amount of Material Processed (material used, etc.) 20,760 MMBtu of Natural Gas			
Hours of Operation: 30	Air Pollution Control Equipment: Dry Low NOx burners		

HAZARDOUS AIR POLLUTANT EMISSIONS:

CHEMICAL EMITTED TO AIR	CAS NUMBER	EMISSIONS QUANTITY	
		Emission Factor (include units)	TONS
Formaldehyde		0.77 lb/hr	0.01
Total HAPS		1.08 lb/hr	0.02

I declare under the penalties of perjury that this report has been examined by me and to the best of my knowledge is a true, correct and complete report.

Print Name of Person Submitting Report	Title	Email
Todd Peterson	Environmental Scientist	Todd.Peterson@mdu.com
Signature Todd Peterson	Telephone Number 701-222-7835	Date 03/10/2015

Return completed form to:
North Dakota Department of Health
Division of Air Quality
918 E Divide, 2nd Floor
Bismarck, ND 58501-1947
Telephone: (701)328-5188

2014

HESKETT STATION UNIT #3 ANNUAL EMISSION INVENTORY WORK SHEET

Simple Cycle Combustion Turbine

Hours of Operation	30	Hours	
Quantity of Fuel (Decatherms (DKT)Natural Gas)	20,760	MMBtu	
Average Heating Value (Natural Gas)	1,054	Btu/CF	
Quantity of Fuel (MCF Natural Gas)	19,690	MCF	
Gross MW	1,823	MWhrs	
Particulate Emission Rate (Filterable + Condensable)	2.03	lb/hr	Based on 2014 PM Test (0.0020lb/MMBtu)
Sulfur Dioxide Emissions	5.5	lb/hr	
Nitrogen Oxide Emissions (CEMS)	0.50	Tons/yr	
Carbon Monoxide (CEMS)	1.3	Tons/yr	
Total Organic Compounds - nonmethane (TOC nm)	3.1	lb/hr	

Particulate - Total *	**Natural Gas**			
((0.0020 lb / MMBtu) X (Quantity of Fuel MMBtu))/2000	=	Natural Gas	=	0.021 tons/yr
PM10 **				
Tons per Year same as total particulate	=	Natural Gas	=	0.021 tons/yr
PM 2.5 **				
Tons per Year same as toal particulate	=	Natural Gas	=	0.021 tons/yr
PM Condensable* (TRC Performance Test 10/02/2015 (0.012 lb/MMBtu))				
((0.0012 lb / MMBtu) X (Quantity of Fuel MMBtu))/2000	=	Natural Gas	=	0.012 tons/yr
SO2 **				
((5.5 lb/hr) X (Hours of Operation)) / 2000	=	Natural Gas	=	0.08 tons/yr
NOx ***				
Total tons emitted as determined by CEMS	=	0.50	=	0.50 tons/yr
CO ***				
Total tons emitted as determined by CEMS	=	1.25	=	1.25 tons/yr
TOC(nm) **				
((3.1 lb/hr) X (Hours of Operation)) / 2000	=	Natural Gas	=	0.05 tons/yr
Formaldehyde**				
((0.77 lb/hr) X (Hours of Operation)) / 2000	=	Natural Gas	=	0.01 tons/yr
Total HAPS**				
((1.08 lb/hr) X (Hours of Operation)) / 2000	=	Natural Gas	=	0.02 tons/yr
Greenhouse Gases (CO2e)***				
Total tons emitted as determined by CEMS	=	1,290	=	1,290 tons/yr

* Per 2014 Emissions Test - TRC #221170B 10/02/2014
** Based on PSD permit application
*** Per CEMS Annual Emissions

FUEL BURNING EQUIPMENT USED FOR INDIRECT HEATING
ANNUAL EMISSION INVENTORY REPORT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8536 (11-10)

GENERAL

Name of Firm or Organization Montana Dakota Utilities Co.	Permit to Operate Number T5-F76001 (PTC13016)	Year of Emissions 2014	
Mailing Address 400 North 4th Street	City Bismarck	State ND	Zip Code 58501
Facility Name RM Heskett Station	Facility Location Mandan, ND	Emission Unit Number EU7	

EQUIPMENT INFORMATION

Manufacturer of Unit Natural Gas Fired In-Line Heater	Model Number	Maximum Heat Input (Btu/hr) 5.0 MMBtu/Hr
Boiler Type: ☐Pulverized Tangential ☐Cyclone ☐Spreader Stoker ☐ Pulverized Wall Fired ☐Fluidized Bed ☐ Other	Electricity Generated (MWe)*	Actual Hours of Operation 30

*Electric utility only.

FUELS USED	Primary Fuel	Standby Fuel	Other Fuel
Type (ex. lignite, natural gas, LPG No. 2 fuel oil, No. 6 fuel oil. etc.)	Natural Gas		
Quantity of Fuel per Year (Specify Units: ex. ton, gal, cu.ft., etc.)	1,161.0 Mcf		
Percent Ash (Coal Only) Maximum Minimum Average			
Percent Sulfur Maximum Minimum Average	2.0 gr./100 scf		
Btu per Unit (Specify lb, ton, gal, etc.) Maximum Minimum Average	1,054 Btu/CF		
Percent Sodium in Coal Ash Average	Not Applicable		

TOTAL STACK EMISSIONS (USE THE TABLE ABOVE FOR SINGLE FUEL USAGE; USE OTHER SIDE IF MULTIPLE FUELS ARE USED AND THEN SUMMARIZE THE TOTAL EMISSIONS PER YEAR ON THE FOLLOWING TABLE.)

Air Contaminant	Emission Factor (Include Units)	Emission Factor Source (Include Test Date if Applicable)	Tons
Particulate – Total	0.002 lb/hr	AP-42 Table 1.4-2	0.0
PM_{10} (Particulate < 10 microns)	0.002 lb/hr	AP-42 Table 1.4-2	0.0
$PM_{2.5}$ (Particulate < 2.5 microns)	0.002 lb/hr	AP-42 Table 1.4-2	0.0
Sulfur Dioxide	0.003 lb/hr	AP-42 Table 1.4-2	0.0
Nitrogen Oxides	0.455 lb/hr	Manufacture Data (from permit application)	0.0
Carbon Monoxide	0.415 lb/hr	Manufacture Data (from permit application)	0.0
Total Organic Compounds: Nonmethane	0.248 lb/hr	Manufacture Data (from permit application)	0.0
Greenhouse Gases (CO2e) (sum of CH_4, CO_2, and NO_2)	0.0495, 116.8, 0.00022 lb/MMBtu	Manufacture Data for unburned CH_4 and 40 CFR 98 Table C-1 and C-2	71.52

I declare under the penalties of perjury that this report has been examined by me and to the best of my knowledge is a true, correct and complete report.

Print Name of Person Submitting Report Todd Peterson	Title Environmental Scientist	Email Todd.Peterson@mdu.com
Signature Todd Peterson	Telephone Number 701-222-7835	Date 03/10/2015

Return completed form to:
North Dakota Department of Health
Division of Air Quality
918 E Divide, 2nd Floor
Bismarck, ND 58501-1947
Telephone: (701)328-5188

2014

HESKETT STATION UNIT #3 IN LINE HEATER ANNUAL EMISSION INVENTORY WORK SHEET

Natural Gas InLine Heater (EU7)		
Hours of Operation	30	Hours
Quantity of Fuel (Decatherms (DKT)Natural Gas)	1,224	MMBtu
Average Heating Value (Natural Gas)	1,054	Btu/CF
Quantity of Fuel (MCF Natural Gas)	1,161	MCF

Particulate - Total *

((0.002 lb/hr X (Hours of Operation)/2000	=	Natural Gas	=	0.00003 tons/yr

PM10 *

Tons per Year same as total particulate	=	Natural Gas	=	0.00003 tons/yr

PM 2.5 *

Tons per Year same as toal particulate	=	Natural Gas	=	0.00003 tons/yr

SO2 *

((0.003 lb/hr) X (Hours of Operation)) / 2000	=	Natural Gas	=	0.00005 tons/yr

NOx **

((0.455 lb/hr) X (Hours of Operation)) / 2000	=	Natural Gas	=	0.00683 tons/yr

CO **

((0.415 lb/hr) X (Hours of Operation)) / 2000	=	Natural Gas	=	0.00623 tons/yr

TOC(nm) **

((0.248 lb/hr) X (Hours of Operation)) / 2000	=	Natural Gas	=	0.00372 tons/yr

Greenhouse Gases (CO2e) * **	=	Natural Gas	=	71.52 tons/yr
((0.0495 lb/MMBtu) X (1,224 MMBtu)) / 2000	=	CH_4	=	0.0303 tons/yr
((116.8 lb/MMBtu) X (1,224 MMBtu)) / 2000	=	CO_2	=	71.49 tons/yr
((0.00022 lb/MMBtu) X (1,224 MMBtu)) / 2000	=	N_2O	=	0.0001 tons/yr

* Per AP-42 Table 1.4-2

** Based on Manufacure Data (from permit application)

*** CO2e represents the sum of CH_4, CO_2, and N_2O muliplied by each respective warming potential based on 40 CFR 98 Table C-1 and C-2

MANUFACTURING OR PROCESSING EQUIPMENT ANNUAL EMISSION INVENTORY REPORT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8537 (11-10)

SIC

GENERAL

Name of Firm or Organization	Permit to Operate Number	Year of Emissions	
Montana Dakota Utilities Co.	T5-F76001	2014	
Mailing Address	City	State	Zip Code
400 North 4th Street	Bismarck	ND	58501
Facility Name	Facility Location	Actual Hours of Operation	
RM Heskett Station	Mandan, ND	See Attached Worksheet	
Source Unit Description		Emission Unit Number	
RM Heskett Station – Coal and Ash Handling Emission Units (Storage Silos and Conveyor Systems)		M1, M3, M4, M5, M6, M7	

RAW MATERIAL INFORMATION

Raw Materials Introduced into Process	Quantity (Specify Units)
Lignite & Subbituminous Coal	517,793 Tons
Coal Ash	55,000 Tons

FUELS USED

		Primary Fuel	Auxiliary Fuel
Type (ex. lignite, natural gas, LPG No. 2 fuel oil, No. 6 fuel oil. etc.)		NA	
Quantity of Fuel per Year (Specify Units: ex. ton, gal, cu.ft., etc.)		NA	
Percent Sulfur	Maximum Minimum Average	NA	
Btu per Unit (Specify lb, ton, gal, etc.)	Maximum Minimum Average	NA	

STACK EMISSIONS

Air Contaminant *	Emission Factor (Include Units)	Emission Factor Source (Include Test Date if Applicable)	Tons
Particulate - Total	See Attached Worksheet	Engineering Estimates	4.56 Tons/Year
PM_{10} (Particulate < 10 microns)			
$PM_{2.5}$ (Particulate < 2.5 microns)			
Sulfur Dioxide			
Nitrogen Oxides			
Carbon Monoxide			
Total Organic Compounds: Nonmethane			

* Submit SFN 19839 for Hazardous Air Pollutants if applicable.

I declare under the penalties of perjury that this report has been examined by me and to the best of my knowledge is a true, correct and complete report.

Print Name of Person Submitting Report	Title	Email
Todd Peterson	Environmental Scientist	Todd.Peterson@mdu.com
Signature: Todd Peterson	Telephone Number: 701-222-7835	Date: 03/10/2014

Return completed form to:
North Dakota Department of Health
Division of Air Quality
918 E Divide, 2nd Floor
Bismarck, ND 58501-1947
Telephone: (701)328-5188

2014

HESKETT STATION SMALL EMISSION UNITS ANNUAL EMISSION INVENTORY WORK SHEET

M1 (includes M2) – Unit 1 Coal Silos			
Hours of Operation (runtime estimated 1.5 hrs per day when Unit 1 is running)	=	467	Hours
Particulate******			
((1.352 lbs / Hour) X (Hours of Operation))/2000	=	0.32	Tons/yr.
M3 (includes 2A, 2B, & 2C) – Unit 2 Coal Silos			
Hours of Operation (runtime estimated 6 hrs per day when Unit 2 is running)	=	1,952	Hours
Particulate*******			
((0.676 lbs / Hour) X (Hours of Operation))/2000	=	0.66	Tons/yr.
M4 – Ash Conveyor System			
Hours of Operation (runtime estimated 6 hrs per day when Unit 1 is running and 18 hrs per day when Unit 2 is running)	=	7,725	Hours
Particulate*******			
((0.255 lbs / Hour) X (Hours of Operation))/2000	=	0.98	Tons/yr.
M5 – Unit 1 Bottom Ash Silo			
Hours of Operation (runtime estimated 8 hrs per day when Unit 1 is running)	=	2,490	Hours
Particulate*******			
((0.255 lbs / Hour) X (Hours of Operation))/2000	=	0.32	Tons/yr.
M6 (includes S2A & S2B) – Sand Storage Silos			
Hours of Operation (runtime estimated 10 hrs per day when Unit 2 is running)	=	3,254	Hours
Particulate*******			
((0.192 lbs / Hour) X (Hours of Operation))/2000	=	0.31	Tons/yr.
M7 – Fly Ash Silo			
Hours of Operation (runtime estimated 6 hrs per day when Unit 1 is running and 18 per day when Unit 2 is running)	=	7,725	Hours
Particulate******			
((0.51 lbs / Hour) X (Hours of Operation))/2000	=	1.97	Tons/yr.
Total of PM Emissions from Significant Material Handling Emission Sources	=	**4.56**	**Tons/yr.**

* Exhaust from sand dryer vented directly into Unit 2 ESP - Actual emissions measured in Unit 2 inventory by CEMS and stack testing

** Engineering Estimate - Assumes 99% control efficiency of potential to emit (PTE) by Unit 2 control equipment

*** Per PTE emission factors listed in Title V Permit application (July 1996)

**** Per AP-42 Method (9/98)

***** Engineering estimate assuming a natural gas sulfur content of 2,000 grains per MMCu.ft. at 1,165 Btu/Cu.ft.

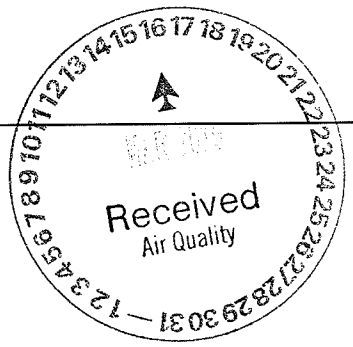
****** Bin Vent Filters (engineering estimated emission factor based on PTE and 98% control efficiency)

******* Fabric Filters (engineering estimated emission factor based on PTE and 99% control efficiency)

******** Per EPA Doc. - Estimating Ammonia Emissions from Anthropogenic Nonagricultural Sources; Table III-1

MONTANA-DAKOTA
UTILITIES CO.
A Division of MDU Resources Group, Inc.

400 North Fourth Street
Bismarck, ND 58501
(701) 222-7900



March 10, 2015

Mr. Terry O'Clair, P.E.
Director, Division of Air Quality
North Dakota Department of Health
918 East Divide Avenue
Bismarck, ND 58501-1947

Re: 2014 R.M. Heskett Station Annual Emissions Inventory

Dear Mr. O'Clair:

The purpose of this letter is to provide formal notice that Montana Dakota Utilities Co. (Montana-Dakota) has submitted the 2014 annual emission inventories as required for R.M. Heskett Station Unit 1, 2 & 3, and associated processing equipment. Enclosed you will find the 2014 annual emission inventory reports, emission inventory worksheets and the hazardous air pollutant (HAP) emission inventory report for each facility.

In response to the North Dakota Department of Health's (NDDH) letter dated on January 5, 2015, please see the enclosed emission inventory worksheet for annual emission calculations for filterable PM2.5, condensable particulate matter (CPM) and mercury. Emission factors used to calculate CPM emissions for both Unit 1 and Unit 2 resulted from an emission engineering study performed by TRC (formerly GE Energy) on August 25, 2011. Based on the calculations Unit 1 had total CPM emissions of 8.4 tons in 2014 and Unit 2 had total CPM emissions of 229.4 tons in 2014. Please note, according to Method 202 all condensable PM is assumed to be in the PM 2.5 ranges, therefore, emission rates for condensable PM10 and PM 2.5 are reported as equal. Based on the calculations Unit 1 had a total of 7.00 lbs of Hg in 2014 and Unit 2 had a total of 10.89 lbs of Hg in 2014.

Also enclosed (CD format) is the continuous emission monitoring (CEM) hourly SO2, NOx, flow and stack temperature data as requested in the NDDH letter dated January 5, 2015.

If you have any questions or need additional information regarding the annual emissions inventories, please contact me at (701) 222-7835.

Sincerely,

Todd Peterson
Environmental Scientist

Enclosures:

cc: Tony Stroh, RM Heskett Station
Joe Geiger, RM Heskett Station
Abbie Krebsbach, Environmental Director